Nesom, G.L. 2013. *Diplacus thompsonii* (Phrymaceae), new species from California. Phytoneuron 2013-46: 1–7. Published 10 July 2013. ISSN 2153 733X

DIPLACUS THOMPSONII (PHRYMACEAE), NEW SPECIES FROM CALIFORNIA

GUY L. NESOM
2925 Hartwood Drive
Fort Worth, Texas 76109
guynesom@sbcglobal.net

ABSTRACT

Diplacus thompsonii Nesom, **sp. nov.**, occurs mostly in Inyo Co., California, with a few populations in immediately adjacent Mono and Kern counties. Plants of *D. thompsonii* were identified by David Thompson (2005) as intermediate between *Mimulus nanus* var. *mephiticus* and *M. bigelovii* but the new species has more features in common with the latter. Leaves of *D. thompsonii*, however, do not show a tendency toward the broad blades with cuspidate tips characteristic of *D. bigelovii* var. *cuspidatus*, the expression of *D. bigelovii* with which it is sympatric. Whether or not the evolutionary origin of *D. thompsonii* involved hybridization, it appears to behave as a distinct species.

KEY WORDS: *Mimulus*, *Diplacus mephiticus*, *Diplacus bigelovii*, California

In preparation of taxonomic treatments for the forthcoming Phrymaceae for the Flora of North American North of Mexico, studies of the genus *Diplacus* Nutt. have led to the recognition of previously undescribed taxa. In addition to the species described here, more new ones and a review of the genus are soon to be published (Nesom in prep.).

DIPLACUS THOMPSONII Nesom, **sp. nov. TYPE: USA. California.** Inyo Co.: 9.0 mi W of Hwy 195 along Whitney Portal Road, level sandy wash areas at base of slides of granitic sand on S side of road (also at 8.7 mi W), 7200 ft, very common locally — hundreds of plants, no mature seeds yet but many plants no longer flowering, 26 May 1988, *D.W. Thompson 917* (holotype: MO!; isotypes: JEPS!, NY (fide Thompson 2005), RSA!).

Similar to *Diplacus mephiticus* in its small purple flowers, narrow leaves, and villous-glandular vestiture; different in its regular (not strongly 2-lipped) corollas, included stamens and stigma, and larger, inflated and strongly wing-angled calyces with apiculate lobes. Similar to *Diplacus bigelovii* var. *bigelovii* in its villous-glandular vestiture, leaves with petiole-like bases, regular corollas, and relatively large, inflated, and strongly wing-angled calyces with apiculate lobes; different in its narrower leaves, smaller calyces, and smaller corollas with narrower limbs and tubes.

Annual herbs. **Stems** 3–15 cm, puberulent to short-villous with gland-tipped hairs; whole plant drying dark purplish. **Leaves** mostly cauline, 7–30 x 2–7 mm, relatively even sized, blades lanceolate or narrowly lanceolate to elliptic-lanceolate, proximal basally narrowed to a petiole-like extension, margin entire, apex acute, surfaces green, puberulent to short-villous with gland-tipped hairs, often less so abaxially. **Flowers** 2 per node or 1–2 per node on a single plant, chasmogamous. **Fruiting pedicels** 1–3 mm. **Calyx** 7–9 mm, inflated in fruit, ribs dark, intercostal areas whitish and membranous, lobes subequal, apices acuminate-attenuate, commonly revolute and forming a long-apiculate tip, sometimes slightly recurving or incurving, ribs villous-glandular, intercostal areas glabrate. **Corolla** marcescent, regular (not 2-lipped), dark magenta to red-purple or pink, throat floor yellowish (yellow coloration of palate ridges broad and nearly confluent) and red-dotted, with a red-purple midvein radiating onto base of each lobe of lower lip, tube-throat 10–14 mm, limb 6–10 mm wide, nearly regular (not distinctly 2-lipped). **Anthers** included, ciliate. **Style** puberulent; stigma included, lobes subequal. **Capsule** 7–9 mm, as long as calyx tube or slightly longer, lanceoid,

dehiscent at apex. $2n = 16$ ($n = 8$, as determined from one plant of *Thompson 917*, the type collection; Thompson 2005).

Flowering (Apr–)May–Jul(–Aug). Granitic soil, gravel, and sand, sandy loam, outwash slopes, dry sagebrush flats, mixed shrub communities, pinyon pine, pinyon pine-Jeffrey pine, pinyon pine-canyon live oak; 1800–2600(–3300) m; Calif.

The epithet of the new species commemorates David M. Thompson, whose detailed and authoritative monograph (2005) of *Mimulus* subgenus *Schizoplacus* (recently considered by Barker et al. 2012 to be the separate genus *Diplacus*) has greatly advanced the understanding of the taxonomy of that group.

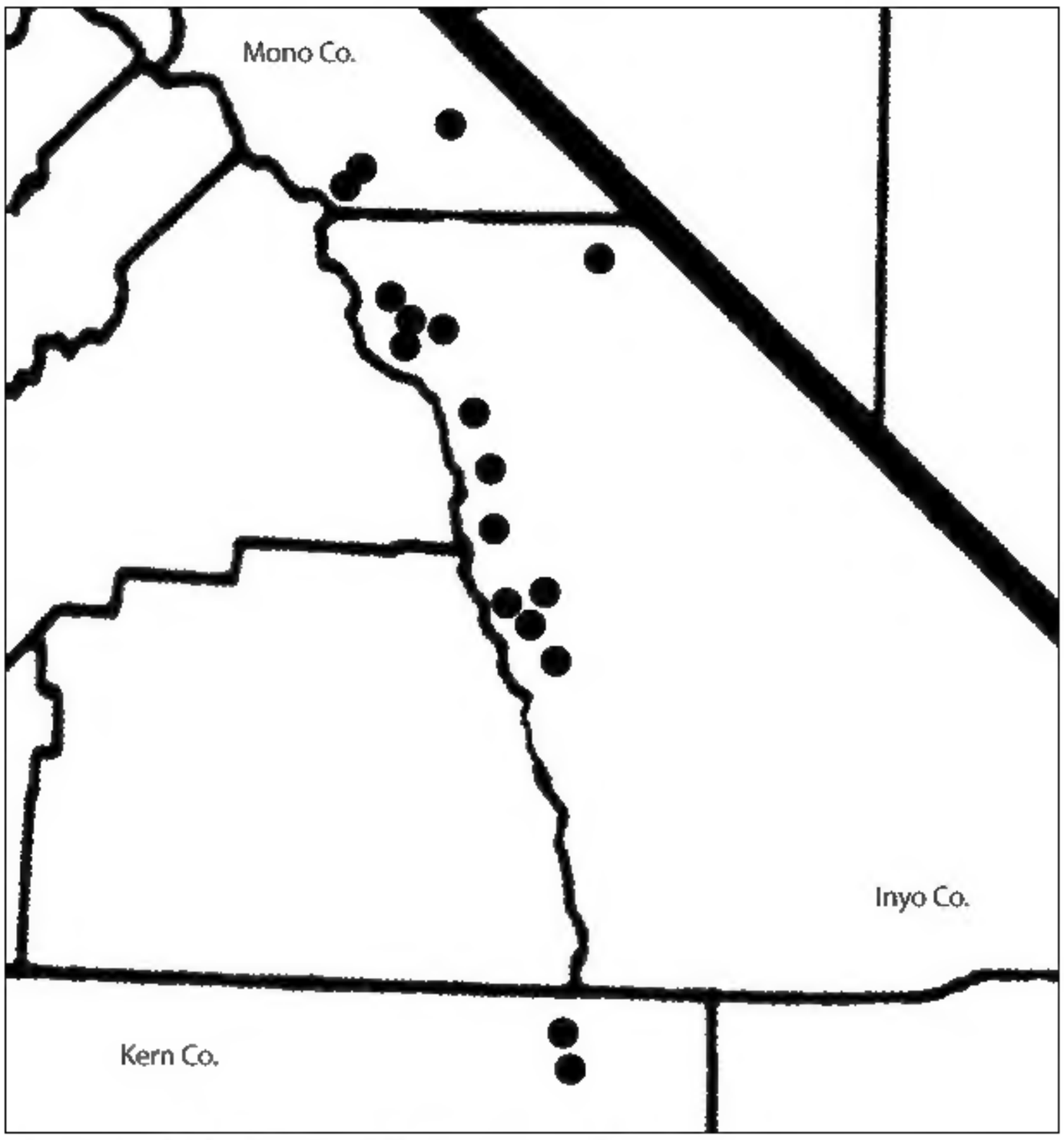

Figure 1. Distribution of *Diplacus thompsonii*.

Additional collections examined. **California**. Inyo Co.: Carroll Creek Canyon, SW of Lone Pine, 5525 ft, 29 May 1942, *Alexander & Kellogg 2888* (PH, UC); Lake Sabrina Road, Owens River Watershed, Upper Sonoran, granite soil, 7800 ft, 29 Apr 1934, *Benson 6021* (POM); Andrews Camp, above Bishop, 1913, *K. Brandegee s.n.* (UC); Andrews Camp, Bishop Creek, Jul 1911, *Davidson 2697* (RSA); Bishop, 1 Jul 1913, *Davidson 2961* (PH, RSA); near Lone Pine Creek, Mt. Whitney Trail, 21 Aug 1937, *Dearing s.n.* (CAS); outwash slope below mouth of Pinyon Creek Canyon, W of Independence, 5500 ft, May 27 1956, *Dedecker 316* (RSA); 1-2 mi S of Mono Co. line on Rte 168 S of Oasis, at milepost 53.50, granite sands of steep roadcut in mixed shrub zone (incl. *Ephedra* and *Psorothamnus*), 5500 ft, locally common, flrs. pink, 31 May 1986, *Ertter 6286* (TEX); Lone Pine

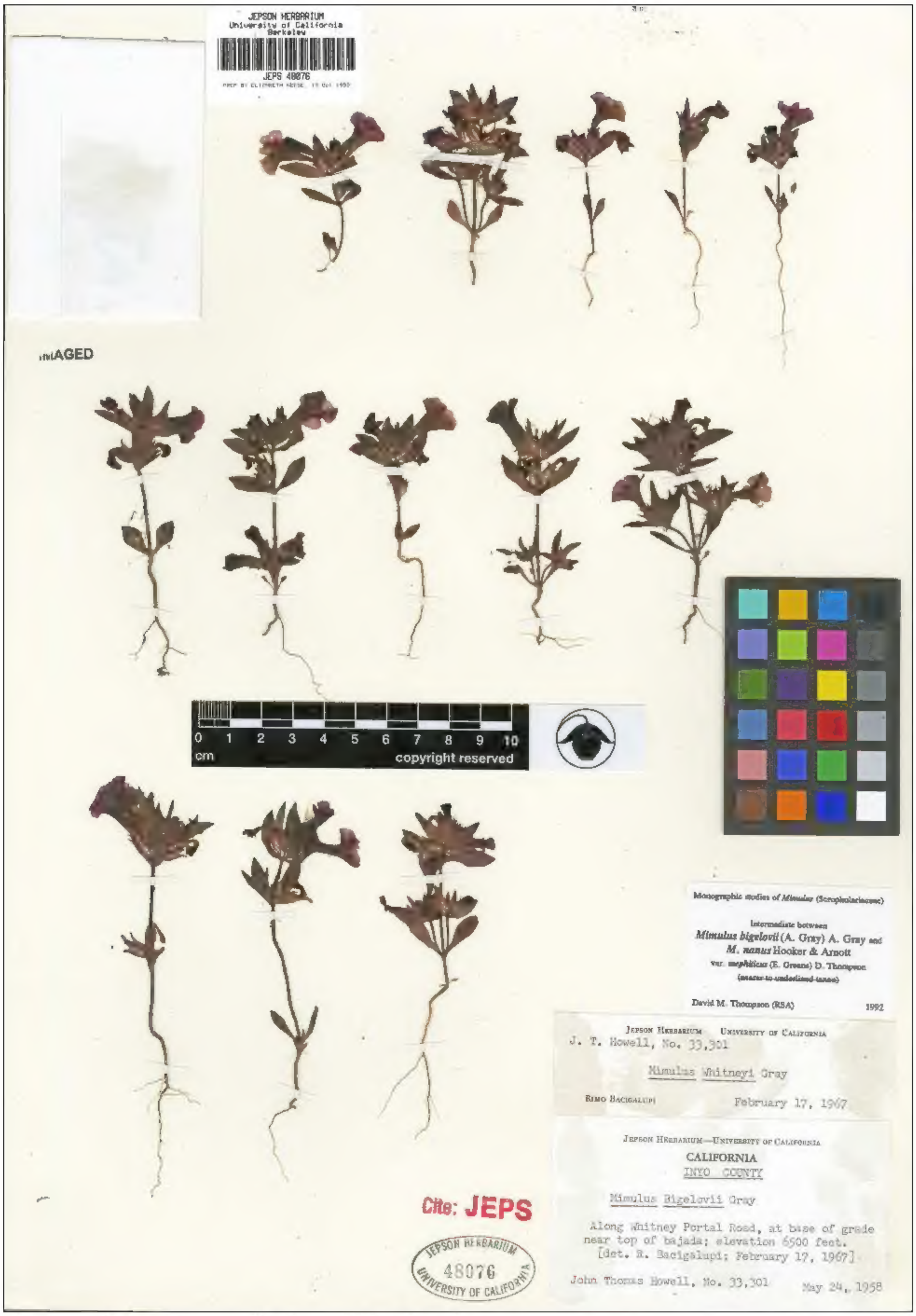
JEPSON HERBARIUM
University of California
Berkeley
JEPS 48076
IMAGED
0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
Monographic studies of Mimulus (Scrophulariaceae)
Intermediate between
Mimulus bigelovii (A. Gray) A. Gray and
M. nanus Hooker & Arnott
var. mephiticus (E. Greene) D. Thompson
David M. Thompson (RSA) 1992
JEPSON HERBARIUM UNIVERSITY OF CALIFORNIA
J. T. Howell, No. 33,301
Mimulus Whitneyi Gray
RIMO BACIGALUPI February 17, 1967
JEPSON HERBARIUM—UNIVERSITY OF CALIFORNIA
CALIFORNIA
INYO COUNTY
Mimulus Bigelovii Gray
Along Whitney Portal Road, at base of grade near top of bajada; elevation 6500 feet.
[det. R. Bacigalupi; February 17, 1967]
John Thomas Howell, No. 33,301 May 24, 1958
Cite: JEPS
JEPSON HERBARIUM
48076
UNIVERSITY OF CALIFORNIA

Figure 2. *Diplacus thompsonii*. *Howell 33,301* (JEPS).

IMAGED
UNIVERSITY HERBARIUM
University of California
Berkeley
UC 129053
cm 0 1 2 3 4 5 6 7 8 9 10
copyright reserved
Monographic studies of Mimulus (Scrophulariaceae)
Intermediate between
Mimulus bigelovii (A. Gray) A. Gray and
M. nanus Hooker & Arnott
var. mephiticus (E. Greene) D. Thompson
(source to underlined taxon)
David M. Thompson (RSA) 1993
HERBARIUM OF THE UNIVERSITY OF CALIFORNIA 129053
JEPSON HERBARIUM, UNIVERSITY OF CALIFORNIA
as identified -
Mimulus bigelovii Gray
RIMO BACIGALUPI July 13, 1955
Desert Flora of Inyo County, California
H. M. HALL and H. P. CHANDLER, No. 7192
Mimulus bigelovii Gray
Calyx angled, lobes acuminate or deltoid
Lone Pine Creek
May 27,

Figure 3. *Diplacus thompsonii. Hall and Chandler 7192* (UC).

Creek, 5500 ft, corolla deep red, May 27 1906, *Hall and Chandler 7192* (UC); foothills W of Bishop, in coarse granitic sand, May 18 1906, *Heller 8279* (CAS, DS, JEPS, MO, PH, POM, UC); Wonoga Peak, 9000-9500 ft, 17 Jul 1949, *Howell 25403* (CAS, RSA); along Whitney Portal Road, 7700 ft, 24 May 1958, *Howell 33275* (CAS, JEPS); along Whitney Portal Road at base of grade near top of bajada, 6500 ft, 24 May 1958, *Howell 33301* (CAS, JEPS); 20.4 mi SW of Lone Pine, site of Old Cottonwood Sawmill, Horshoe Meadow Road, in loose roadside gravel, near spring, 10,000 ft, 30 Jul 1974, *Keefe 16,028* (CAS); head of Division Creek road, 6500 ft, 27 May 1938, *Kerr s.n.* (CAS); Mt. Whitney Portals, 8200 ft, 9 Jul 1939, *Kerr s.n.* (CAS); Carroll Creek to Little Cottonwood Creek, scattered on dry loose gravel of disintegrated, granite, with pinyon and Jeffrey pine, 9000 ft, 17 Jul 1949, *Munz 14019* (RSA, UC); Buttermilk, CF&Res Forest and Range Expt. Sta., Inyo National Forest, slope 10%, shallow sandy loam (granitic), 7000 ft, 20 Jun 1957, *Nord and Bentley N-35* (JEPS); Taboose Creek, lower Jeffrey pine belt, 7500 ft, 12 Jul 1956, *Raven 9715A* (CAS); Sierra Nevada, east slope, Whitney Portal Road, W of Lone Pine, 6900 ft, 24 May 1958, *Rose 58067* (CAS); Lake Sabrina Road, North Fork of Bishop Creek bridge, sagebrush association, small rather dense colony in light loamy soil, 5800 ft, 22 May 1969, *Twisselman 15522* (CAS, JEPS, MO). Kern Co.: Kern Plateau, BLM-Owens Peak Wilderness, along the saddle below the summit of Owens Peak from Indian Wells Canyon, rocky metamorphic slopes in pinyon pine and canyon live oak woodland with scattered *Nolina parryi*, 7700 ft, 25 May 1985, *Shevock 11199* (CAS); BLM-California Desert Conservation Area, Owens Peak Wilderness, along the Pacific Crest Trail at the eastern slope of Mt. Jenkins, 35° 42'30" N, 117° 59' 30" W, on rocky metamorphic slope in a pinyon pine woodland, 2000 m, 21 Apr 1986, *Shevock 11443* (CAS, RSA). Mono Co.: Rock Creek, on dry flats between *Artemisia tridentata*, 6700 ft, 15 May 1947, *Munz 11783* (CAS, DS, PH, RSA); S side of Hwy 120, 2.4 mi E of Hwy 395, sandy berm, 6740 ft, 23 Jun 1998, *Schoenig 98-66* (CHSC); SW of Tom's Place, 0.3-0.5 mi SW of Hwy 395 along Rock Creek Road, SE side of road, very localized on sandy areas among sagebrush on periphery of small Jeffrey and pinyon pine groves, 2150 m, 28 May 1988, *Thompson 919* (RSA); Owens Valley/Sierra Nevada Mountains 0.7 mi south of Tom's Place on Hwy 395, [south] of Mammoth turnoff, Inyo National Forest, 6400 ft, 20 Jun 1955, *Vasek 273* (UCR).

Diplacus thompsonii has been abundantly collected along the eastern side of the Sierra Nevada in Inyo County and closely adjacent areas of Kern County and Mono County. Thompson (2005) consistently identified these plants as intermediate between *Mimulus nanus* var. *mephiticus* and *M. bigelovii*, this assessment probably weighting their occurrence in the area where the two putatively parental species are sympatric. Thompson's label observations for the type collection (*Thompson 917*) do not mention the occurrence of either putative parent in the immediate vicinity. Nor, apparently, has any other sampled population among the collections examined been explicitly suspected of being hybrid in origin, at least as indicated on label information. .

Given the strong similarities of *Diplacus thompsonii* to *D. bigelovii* (leaves with petiole-like bases, regular corolla limbs, included stamens and stigma, angled and inflated calyces) and lack of features characteristic of *D. mephiticus* (strongly 2-lipped corollas, exserted stamens and stigma, weakly angled and uninflated calyces), a hypothesis that *D. thompsonii* arose from a close common ancestor with *D. bigelovii*, through processes apart from hybridization, seems reasonable. *Diplacus thompsonii*, however, apparently occurs in large, fully reproductive populations and whether or not the evolutionary origin of *D. thompsonii* involved hybridization, it appears to behave as a distinct species.

The contrasts below distinguish *Diplacus thompsonii* from *D. mephiticus* and *D. bigelovii*. All three have purple flowers (sometimes yellow in *D. mephiticus*), relatively narrow leaves, and villous-glandular vestiture. Leaves of *D. thompsonii* do not show a tendency toward the broad blades with cuspidate apices characteristic of *D. bigelovii* var. *cuspidatus*, the expression of *D. bigelovii* with which it is sympatric.

1. Corollas strongly 2-lipped; calyces slightly inflated or not at all, weakly angled, lobe apices acute to acuminate, erect; stigma exserted or at opening of corolla tube-throat ..... **Diplacus mephiticus**
1. Corollas nearly regular (not strongly 2-lipped); calyces inflated and strongly wing-angled, lobe apices acuminate-attenuate, commonly revolute and forming a long-apiculate tip, sometimes slightly recurving or incurving; stigma included within corolla tube-throat.

2. Leaves 2–15(–26) mm wide; calyx 6–13(–15) mm; tube-throat (9–)12–22 mm, limb 12–24 mm wide ..... **Diplacus bigelovii** var. **bigelovii**
2. Leaves 2–7 mm wide; calyx 7–9 mm; tube-throat 10–14 mm, limb 6–10 mm wide ..... **Diplacus thompsonii**

Given the strong similarities of *Diplacus thompsonii* to *D. bigelovii* (leaves with petiole-like bases, regular corolla limbs, included stamens and stigma, angled and inflated calyces) and lack of features characteristic of *D. mephiticus* (strongly 2-lipped corollas, exserted stamens and stigma, weakly angled and uninflated calyces), a hypothesis that *D. thompsonii* arose from a close common ancestor with *D. bigelovii*, through processes apart from hybridization, seems reasonable. Leaves of *D. thompsonii* do not show a tendency toward the broad blades with cuspidate tips characteristic of *D. bigelovii* var. *cuspidatus*, the expression of *D. bigelovii* with which it is sympatric.

Comments on *Diplacus mephiticus*

In agreement with Thompson, various names are treated here as synonyms of *Diplacus mephiticus*, although he treated the latter at subspecific rank with *Mimulus nanus*. *Mimulus coccineus* Congdon (mostly California Sierra from Tulare to Eldorado counties, and apparently including *Eunanus angustifolius* Greene from Mt. Rose, Nevada) includes small, tufted plants at high elevations with small calyces and small, dark red-purple, strongly 2-lipped corollas with prominently exserted stamens. *Mimulus densus* A.L. Grant (mostly Nevada counties and Lassen, Nevada, and Plumas counties, California) includes taller plants at lower elevations with a strong tendency to produce populations with all individuals with larger, yellow, nearly regular (non 2-lipped) corollas with more nearly included stamens. Typical *Diplacus mephiticus* has moderate-sized plants at medium elevations with purple, 2-lipped corollas. Possible discontinuities in variation among these expressions need to be studied in more detail.

The epithet mephiticus alludes to musky odor of the plants, which has been noted by collectors also for forms identifiable as *Mimulus coccineus* and *M. densus*. *Diplacus nanus*, within which *D. mephiticus* was treated as a variety by Thompson (2005), apparently has not been noted to produce a mephitic odor. Among other close relatives, *D. cusickii* (Greene) Nesom also produces a mephitic odor, as noted by various collectors.

Comments on *Diplacus bigelovii*

Diplacus bigelovii can generally be recognized by its relatively large corollas, included stigmas, and inflated mature calyces with lobes of unequal length and with acuminate-attenuate apices. The two varieties are distinct in leaf shape. Thompson (2005) mapped them as very closely parapatric and noted that they show "limited intergradation" near their contiguous occurrence. It seems at least a hypothesis worth investigating that var. *cuspidatus* is more closely related to species with a similar leaf shape (*D. cusickii*, *D. cusickioides*, *D. deschutesensis*, *D. ovatus*) than to var. *bigelovii*.

1. Distal leaves becoming narrower and apically more long-tapered or more gradually acuminate than those proximal; internodes usually unequal, the most basal few much longer than the others ..... **Diplacus bigelovii** var. **bigelovii**

1. Distal leaves as wide or wider than proximal and usually (except in highest Panamint Mts.) apically abruptly acuminate; internodes subequal (sometimes somewhat more congested near stem tips under conditions of severe drought stress, when many of the basal leaves are usually scorched) ..... **Diplacus bigelovii** var. **cuspidatus**

ACKNOWLEDGEMENTS

I am grateful to staffs at CAS-DS, BRIT-SMU, CHSC, MO, PH, and TEX-LL for hospitality and assistance during visits there, to RSA-POM for a loan (to BRIT) of specimens, and to UC-JEPS for a high-res "digital loan" of specimens. Extended study at CAS was made possible by support from that institution, and the author's broader employment is supported by the Flora of North America Association

LITERATURE CITED

Barker, W.R., G.L. Nesom, P.M. Beardsley, and N.S. Fraga. 2012. A taxonomic conspectus of Phrymaceae: A narrowed circumscription for *Mimulus,* new and resurrected genera, and new names and combinations. Phytoneuron 2012-39: 1–60.

Thompson, D.M. 2005. Systematics of *Mimulus* subgenus *Schizoplacus* (Scrophulariaceae). Syst. Bot. Monogr. 75: 1–213.